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Fuels and Lubricants Research Division

Detroit Diesel DD13 Engine Scuffing Test (ASTM D8074)

Specifications

Detroit Diesel Internal Specification

Objective

This test method was developed to evaluate a lubricant's performance to protect against adhesive wear between an uncoated piston ring and cylinder liner.

Field Service Simulated

Heavy-duty, on-highway turbocharged and intercooled diesel engines equipped with EGR and running on ultra-low sulfur diesel fuel.

Test Fixture

Modified Detroit Diesel DD13 (Daimler OM471) diesel engine, common rail fuel system, with high flow injectors. It is a 12.8L, open chamber, in-line six cylinder, four stroke, turbocharged and intercooled.

Test Parameters

- The test engine is operated for up to 200 hours or until scuffing occurs.
- The test is run using 15 PPM sulfur diesel fuel (PC-10 test fuel).
- The first 30 hours are conducted at rated speed and approximately 800 Nm (~50% throttle).
- The final 170 hours are conducted at rated speed and approximately 1800 Nm (~80% throttle).

Test Parts Evaluation

- Cylinder Liner Scuffing Rating
- Top Ring Weight Loss

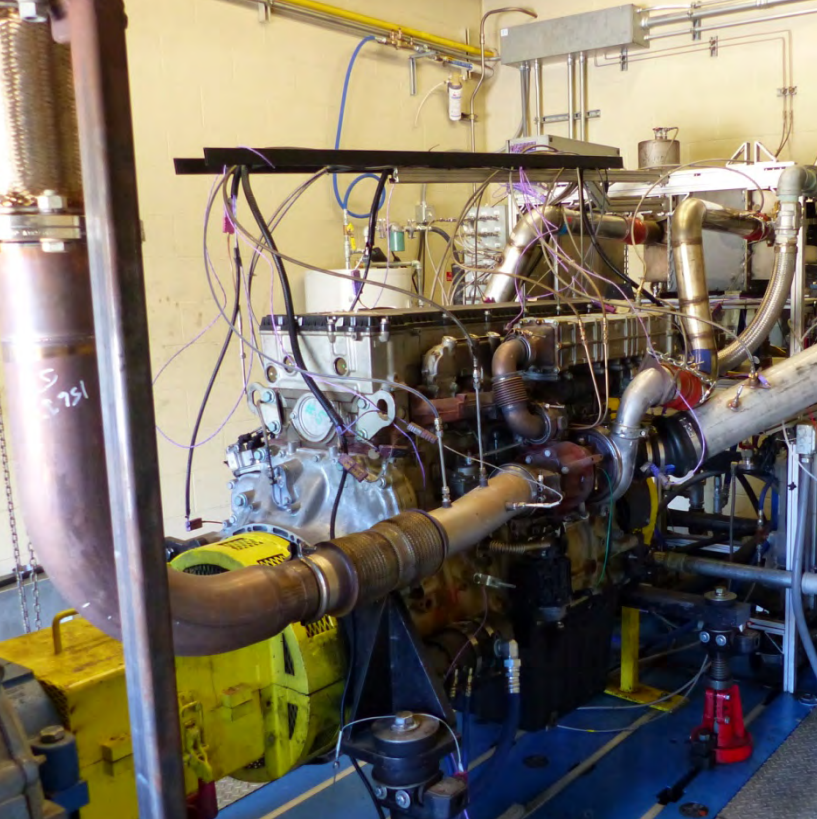
Used Lubricant Analysis

- Viscosity @ 100°C (ASTM D445)
- High Temp, High Shear (ASTM 4683)
- TAN (ASTM D664)
- TBN (ASTM D4739)
- Wear Metals (ASTM D5185)
- Oxidation by FTIR
- Soot by TGA

Pass/Fail Criteria

Pass/fail criteria of Hours to Scuff is based on the number of hours run prior to scuffing. This is evaluated based on a minimum amount of cylinder liner scuffing, top ring weight loss achieved at EOT and point in test hours where a 25 PPM or greater rate increase in iron concentration from used oil analysis is observed.





We welcome your inquiries.
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